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words, the efficiency of precipitation is least during the period of greatest need. The interception by full grown field crops is comparable in value with that from trees.

Selections from previously collected data and a short bibliography add their value to HORTON'S report.—GEO. D. FULLER.

**Hawaiian Lobelioideae.**—ROCK<sup>23</sup> has published an elaborately printed and profusely illustrated monograph of the Hawaiian Lobelioideae. The very numerous photographic reproductions make the monograph almost equivalent to an herbarium set of the material. The tribe represents the family Lobeliaceae as ordinarily presented, and in the Hawaiian Islands includes 7 genera, 6 of which are endemic. The author has been studying this group for nearly 10 years, and has increased the 58 species of HILLEBRAND'S *Flora* to 104, all peculiar to the Islands; and in his opinion many more species will be brought to light, especially in the genus *Cyanea*, which in the monograph includes 52 species. The only genus of world-wide distribution is *Lobelia*, which is credited with 11 species in the Islands, 4 of which are new. The first part of the monograph contains a general discussion of structure, habit, and distribution.—J. M. C.

**Evolution of cotyledony.**—BUCHHOLZ<sup>24</sup> has investigated the ontogeny of the cotyledons in a number of living conifers, and has reached some important conclusions. He finds in certain conifers a considerable number of primordia, which may develop a corresponding number of cotyledons, or fusions may occur, thus reducing the number. In no case was there any evidence of increasing the number of cotyledons by splitting. The fusions resulting in a reduced number of cotyledons in some cases resulted also in cotyledonary tubes. The inference is that polycotyledony is primitive; that dicotyledony was attained by a general fusion of many cotyledons into two groups or by a bilabiate development of the cotyledonary tube; and that monocotyledony is the result of a cotyledonary tube becoming unilabiate. This evolutionary sequence seems to be borne out by all the facts at hand, and relates the different forms of cotyledony in a natural way.—J.M.C.

**Proceedings of the Indiana Academy.**—The volume of Proceedings of the Indiana Academy of Science for 1918 has just been distributed, including 327 pages and numerous illustrations. Among the botanical contributions published are the following: The barberry and its relation to the stem rust of wheat in Indiana, F. J. PIPAL; A method of teaching diffusion and osmosis

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<sup>23</sup> ROCK, JOSEPH F., A monographic study of the Hawaiian species of the tribe Lobelioideae, family Campanulaceae. Publ. Bernice Pauahi Bishop Museum. 4to pp. xvi+395. *pls.* 217. 1919.

<sup>24</sup> BUCHHOLZ, JOHN T., Studies concerning the evolutionary status of polycotyledony. *Amer. Jour. Bot.* 6:106-119. *figs.* 25. 1919.

in connection with biological work, PAUL WEATHERWAX; Bacteria in frozen soil, H. A. NOYES; Some abnormalities in plant structure, M. S. MARKLE; Plants of Boone County, Kentucky, JAMES C. NELSON; Plants new to Indiana. VIII, CHARLES C. DEAM; Analyses of 100 soils in Allen County, Indiana, R. H. CARR and V. R. PHARES; The relation of nitrogen, phosphorus, and organic matter to corn yield in Elkhart County, Indiana, R. H. CARR and LEROY HOFFMAN; Soil survey of Cass County, Indiana, COLONZO C. BEALS; Ascomycetes new to the flora of Indiana, BRUCE FINK and SYLVIA C. FUSON; The dormant period of timothy seed after harvesting, M. L. FISHER.—J. M. C.

**Douglas firs.**—HENRY<sup>25</sup> and FLOOD have described three American and four Asiatic species of *Pseudotsuga*, separating the Pacific Coast trees from those found in the Rocky Mountains. Aside from some minor differences in leaf and cone structure, the authors believe that the Rocky Mountain form, *P. glauca*, shows more xerophytic structures and is much more resistant to injury by frost and drought. The differences in the behavior of the two forms under silvicultural conditions in Great Britain seems to afford a much better basis for considering the eastern form a separate species. Of the Asiatic species, one is native to Japan, one to Formosa, and two are native to Yunnan, China. All are found in restricted areas and are to be regarded as so rare as to be of little economic importance.—GEO. D. FULLER.

**Evaporation and vapor pressure deficit.**—It has been shown by JOHNSTON<sup>26</sup> that it is possible, by using vapor pressure deficit and wind velocity data, the former being derived from hygrometer and thermometer readings, to calculate the "potential evaporation" or evaporating power of the air in a manner that will show a very close agreement with the records from the porous cup atmometer. In this way considerable data collected by the Weather Bureau may be translated into terms that are significant and valuable for the ecologist.—GEO. D. FULLER.

**Plantago in Hawaii.**—ROCK<sup>27</sup> has monographed the two endemic species of *Plantago* occurring in the Hawaiian Islands. One of them, *P. princeps*, is a branching shrub, and its variability is indicated by the fact that 8 varieties are recognized. The other species, *P. pachyphylla*, includes 7 varieties, among which there is a new one (var. *anomala*) which combines the characteristic capsule and venation of *P. pachyphylla* with the seeds and arborescent branching habit of *P. princeps*.—J. M. C.

<sup>25</sup> HENRY, A., and FLOOD, MARGARET G., The Douglas firs: a botanical and silvicultural description of the various species of *Pseudotsuga*. Proc. Roy. Irish Acad. 35: sect. B. 67-92. pls. 12-14. 1920.

<sup>26</sup> JOHNSTON, E. S., Evaporation compared with vapor pressure deficit and wind velocity. Mo. Weather Rev. 47:30-33. figs. 2. 1919.

<sup>27</sup> ROCK, J. F., The genus *Plantago* in Hawaii. Amer. Jour. Bot. 7:195-210. pl. 13. 1920.